PAO This is Apollo Control Houston. We are breaking shift at this time. Flight Director, Clifford Charlesworth and his green team are now aboard. We do want to announce again that the change of shift briefing for Glen Lunney, Flight Director, is scheduled for 4:15 pm and at 129 hours 12 minutes into the flight of Apollo 8 this is Apollo Control at Houston.

END OF TAPE

PAO This is Apollo Control at 130 hours 24 minutes during our change of shift press briefing now, the crew has been primary involved in some guidance and navigation activities onboard the spacecraft. Frank Borman reported that Bill Anders is sleeping at the present time and at the present time our spacecraft is traveling at a speed of 6,417 feet per second our current altitude is 88,706 nautical miles and this is how the conversation has been going up to now.

CAPCOM Apollo 8, Houston.

SC Go ahead.

CAPCOM Roger, entry interface minus 4 hours is just about right for the VHF. That is about 1:42 GET.

SC Roger, thank you.

CAPCOM The next voice you hear will be that of the smiling Irish Man.

SC Outstanding.

CAPCOM Apollo 8, Houston. Over.

SC Go ahead.

CAPCOM Good morning, James.

SC Oh, it's Michael McCollums is it. Good morning to you.

CAPCOM Righto and we're looking at your pitch FDU readout down here and looks to us like you are about 25 degrees off the 180 for your PTC and we were just wondering how come?

SC We've been looking at that too. It keeps wiring off in pitch for some reason just before the yaw. I was just about ready to go back to it again. I had to go back one time and I was just seeing how far she would drift. Ithought it would drift out a ways and come back by itself bt it is not doing it. We'll get back there

SC Houston, Apollo 8, we are in the process of doing the Trunion Bias check then we will go to P23.

CAPCOM Okay, thank you, Frank.

SC Houston, Apollo 8.

CAPCOM Apollo 8, Houston, GO.

SC We like to have the PTC Attitude to comply with P23 requirements.

CAPCOM Roger,Frank, standby. Apollo 8, Houston.

SC Go ahead.

CAPCOM Any time you want to start on those P23's is just fine.

SC Okay, I was just checking. I just wanted to know how our thermal control was going before we left.

CAPCOM Apollo 8, Houston, over.

SC Go ahead Houston, Apollo 8.

CAPCOM Say, your temperatures are looking good Frank. There is still a differential temperature between quads but nothing that would cause us in this weather to

CAPCOM worry about just a plain thing.
SC Roger, understand.
CAPCOM Apollo 8, Houston, over.
SC Go ahead.
CAPCOM Thank you, Jim. We've been looking at these stars that we gave you this time for P23. It looks like the second star number 11 has a trunnion angle right out to the limit about 49.7 degrees and we're thinking it might be a good idea to switch to star 1 which has a much smaller Trunnion angle. What do you think star 1 is Alpheratz.
SC Fine with me. I would just as soon take star 1.
CAPCOM Okay, that will be then in place of star 11, star 1 and in place of lunar far horizon, lunar near horizon and it remains 2 sets over.
SC Roger, star 1, lunar near horizon 2 sets
CAPCOM Thank you. Apollo 8, Houston, over. Apollo 8, Houston, over.
SC Read you, Apollo 8.
CAPCOM Roger, fine. Golden fingers there is getting so swift we missed some marks on the down link. I wonder if you hand recorded them could you read us your 3 marks Trunnion angles, your 3 Trunnion angles on star 2 and the last 4 Trunnion angles on star 1, over.
SC ... angles
CAPCOM Standby, we're not reading you good enough so we will wait until you get better omni.
SC That ought to be a good one.
CAPCOM That is a good one. Loud and clear.
SC Okay, star 2 Trunnion angle first one 05245, second one 05243, next one 05241, last 4 Trunnion angles 04133, 04133, 04132, 04132.
CAPCOM Thank you kindly.
SC Can you give me some idea on the updates from the midcourse that we might need and all that good stuff.
CAPCOM Yeah, sure can, Frank, standby. Apollo 8, Houston, over.
SC Go ahead, Mike.
CAPCOM Okay, we're predicting at the nominal time of your next midcourse which is entry interface minus 2 hours, we're predicting 1.4 foot per second burn which changes your gamma at entry interface by a tenth of a degree. Right now with no further maneuvers your gamma is minus 6.39 degrees and we're going to steepen it up very slightly to hit the center of the target line and it will be after the maneuver minus 6.51 over.
SC Very good.
CAPCOM Anything else you want like that?
SC No I just wondered we hadn't heard whether we were going to do it or not.

SC Let me get the pad data and we'll get it all out here.

CAPCOM Yeah, we'll be sending the pad data up to you in about another 2 hours, Frank. About 132 hours GET.

SC Okay, We, this will be the last set of star sightings we do now nominally and even if we loose COMM, we'll just come on in with we got.

CAPCOM Okay, Frank.

SC Incidentally that COMM has been fantastic. I don't know how you've heard us but boy, it's just like you are next door even in lunar distance.

CAPCOM Yeah, it has really been great with rare exceptions when you are on a bad OMNI right before you switch and we get an awful lot of background noise, but in general it has been excellent and boy, we are really thankful for it because reading all these updates would be bad news with bad COMM as you know.

SC Right. Say, Mike, have you noticed the confidence the Captain has in his navigator?

CAPCOM He hasn't called you Gold Finger yet.

SC No, he is disregarding anything I can do. We're coming in anyway.

CAPCOM I expect he is right on that point.

SC Well, back to the drawing board. As usual, we are all pooped. I've got Bill sleeping now and then Jim and I will go off just as soon as we get through with these stars.

CAPCOM Well, you're sounding real good and you are doing good work.

SC Thank you.

PAO This is Apollo Control. That brings us up with the conversation as they developed during the press conference. We'll continue to stand by briefly for any life communications that develop with the crew.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/26/68, GET 1311900 CST 6:10p, 390/1

PAO This is Apollo Control at 131 hours 19 minutes: Our current spacecraft velocity at this time is 6567 feet per second, and we're at an altitude of 85 284 nautical miles. Since our previous report, it's been very quiet here in the Mission Control Center. Most of the activity has involved checking, double checking figures, and beginning preparation to pass up the information to the crew that they will need for their final mid-course correction, at 2 hours prior to entry. We've had one or two very brief conversations with the spacecraft. We'll pick those up and then stand by for any live conversation that develops.

CAPCOM Apollo 8, Houston.

SC Go ahead, Houston, Apollo 8.

CAPCOM Roger, Frank. If you get a chance to, we'd like for you to read us down your trunnion calibration number. We missed that one on the down link and we have an update for your passive thermal control attitude.

SC The trunnion calibration are all zeros.

CAPCOM Roger. Thank you and on page 2104 the PTC attitudes should read 0 Pitch and 45 degrees Yaw. Over.

SC 0 Pitch and 45 degrees that's 2104.

CAPCOM Roger, and we'd like some PRD readings for those (garble) up and around.

CAPCOM Let that slip.

SC 0 Pitch 45 Yaw, it is.

CAPCOM Roger. Thank you.

SC I'm asking (garbled)

CAPCOM That's affirmative Frank. 0 Pitch 45 degrees Yaw.

SC My PRD now reads 2.85.

CAPCOM 2.85

END OF TAPE.

PAO This is Apollo Control, Houston at 132 hours, 9 minutes. Apollo 8 is at an altitude 1, or rather, 82 111 nautical miles and our current velocity is 6712 feet per second. It continues to be very quiet here in Mission Control and aboard the spacecraft. We've had one or two very brief conversations with the crew and we're anticipating a call up to the spacecraft, shortly, from Mike Collins, so we'll pick that up and then stay tuned.

CAPCOM Apollo 8, Houston. Radio check, over.

SC This is 8, loud and clear, hello.

CAPCOM Well, you're loud and clear, Jim. I'd like to get your PRD reading where we can dock you up and oa flight plan change we're suggesting on page 2-107 when you're ready to copy.

SC Roger. Standby. I'm the only person up and my PRD is reading .15.

CAPCOM Roger, I understand, .15.

SC And I'll bet that -

CAPCOM That's okay, don't bother them right now if he's asleep.

SC Houston, Apollo 8. Go ahead with your flight plan change.

CAPCOM Okay, Jim. On page 2-107 we're recommending that you delete that P-52 and just stay in PTC attitude. Your platform if real good and we don't feel that alignment is necessary. One is coming up again at 139 hours anyway. And also, on that same page we'd like to delete the begin cabin cold soak. Over.

SC Righto! Will delete the begin cabin cold soak and will delete the P-52.

CAPCOM Okay, thank you.

CAPCOM Roger, Apollo 8. This is Houston. Over.

SC Roger, Mike. Are you still planning to send up these updates at 132 hours?

CAPCOM Yes, affirmative, Jim. We're getting them together now.

SC Roger.

CAPCOM Apollo 8, this is Houston. Would you please go to POO and accept, Jim, and we'll send you a P-27.

SC We're ready for you.

CAPCOM Okay. Sending up a state vector to LM slant.

CAPCOM Apollo 8, this is Houston. Over.

SC Go ahead, Houston.

CAPCOM Roger, Jim. You can go back to block. We got the P-27 in and verified. It was a state vector update to the LM clock, and I'm standing by for the mid-course correction number 7 and the entry pass at you're convience, over.

SC Roger, standby. Go ahead with midcourse number 7.

CAPCOM Okay, midcourse correction number 7 RCS for S, D, and N. It's 3, 1, 6, 0, 0, not applicable. not applicable. 1 4 4 4 5 5 7 9 9 minus 0 0 0 1 4 plus five 0's plus 0 0 0 0 1, are you with me so far, over.

SC Roger, with you.

CAPCOM Good. 0 0 0 3 0 4 0 0 0 not applicable. 0 0 0 1 9 1 0 0 0 1 4 0 0 4 0 0 0 1 4 4 5 0 -

SC Hey, Mike, hold it, hold it, Mike.

CAPCOM Okay, holding.

SC You said not applicable for AJ and HB I started to copy it down and then I didn't get the right number sequence. Did you skip down to what? BG?

CAPCOM No, let's go back to apogee is not applicable and then I just start reading the numbers again from there I've got a perigee and then a delta V and then a burn time and so forth. Over.

SC Okay. I didn't hear a plus or minus on the HP and I only got four numbers off of it so could you start with HP again.

CAPCOM Okay. Going back to apogee not applicable. Perigee plus 0 0 1 9 1. And you weren't hearing anything. That was my mistake, over.

SC Roger.

CAPCOM Okay, picking up with DELTA-V. 0 0 0 1 4 0 remarks: perigee in P-30 equals plus 22.2 nautical miles, over.

SC Roger. Midcourse number 7 RCS, GNM, 31600 not applicable, not applicable, 144455799, are you with me?

CAPCOM I'm with you.

SC Minus 00014, plus all zeros, plus 00001 000304000, not applicable, plus 00191000140040001445045922 5 Charla, up 236000, plus 0813, minus 165031220236301146464 1 (Garbled) 308209357, HP and P-30 are the 22.2 nautical miles.

CAPCOM That's all correct, Jim, and I have the entry pad at your convenience.

SC Okay, Roger, Standby a minute. Ready to copy, Mike.

CAPCOM Okay. Entry pad. Area is mid-Pacific 35715235914629132 68 plus 0813 minus 165030683622165112202363 0114646130028, not applicable four times, in other words, DL Max, Dl Min, VL Max, and VL Min, and all not applicable. starting with B040002070025033.

END OF TAPE

CAPCOM 00265 0333 0816 16 0590 312 and your vortex star is Zetapersa, which is half way between Mirfak and Aldebaran, up 165 right 34 up remarks is non exit EMS pattern. Over.

SC (Garble) entry as follows mid Pacific. 357 152 359 146 2913 268 plus 0813 minus 16503 068 36221 651 12202 36301 146 4613 0028 NA 4 times, stereo 400 0207 0025 0333 0816 16 0590 312 Zetapersa up 165 right 34 up and remarks use non exit and EMS pattern. And Zetapersa is between Mirfak and Aldebaran, and (garble)

CAPCOM Okay, that's real good.

SC We certainly don't waste much time in getting down to throat deploy, do we?

CAPCOM Roger. That's true.

END OF TAPE

PAO This is Apollo Control at 132 hours 38 minutes. At the present time, we're in touch with the spacecraft. We'll pick up that conversation for you and then stand by to follow it as it develops.

CAPCOM Apollo 8, Houston. Over.

SC Go ahead, Houston.

CAPCOM Roger, Jim. In your computer, we'd like to do an eraseable memory dump again, like we did the other day, and the reason we'd like to do it is when you did that P-37 about 8 hours ago, and remember you put that EI time into the tig and got that koodo thing. We'd like to - we don't think there's anything in the world wrong with it. We think everything is just perfect inside the computer, but we'd like to do an eraseable dump as we did the other day, go through it bit by bit. Give us something to do down here. Over.

SC Okay. Any time.

CAPCOM And I have the procedures for you when you're ready to copy.

SC Go ahead.

CAPCOM Okay. Verb 01 Noun 01 Enter 333 Enter, and then read out register 1 and that register 1 should be 10 000 - 1 0 0 0 0, and then if it's not, I can give you procedures for getting it to 10 000. If it is 10 000 as we expect, then Verb 74 Enter and that will do the dump. Over.

SC Roger. When do you want it?

CAPCOM Apollo 8, you can do the first part of that now at your convenience to verify that register 1 is reading 10 000 but would you hold up on the dump, itself, until we get our ground stations configured, please. Over.

SC Will do - wait.

CAPCOM Jim, we're getting noisy down here. Could you switch on the antenna, please?

CAPCOM Thank you, sir.

CAPCOM That works pretty well, doesn't it?

SC Not bad. I was amazed at such good communication at the Moon, too.

CAPCOM Apollo 8, Houston. We're configured for the dump. Verb 74 enter at your convenience.

SC Roger.

CAPCOM Apollo 8, Houston the dump is complete and it's your computer. Thank you.

SC Roger.

END OF TAPE

PAO This is Apollo Control, Houston, at 133 hours 12 minutes. At this point Apollo 8 is traveling at a velocity of 6914 feet per second, and our current altitude reading is 77 946 nautical miles. We've just heard from Bill Anders for the first time in about 3 hours. Bill has been getting some rest and we anticipate at this time both Borman and Lovell are resting while Bill is on watch. We'll pick up that conversation for you now.

SC Houston, Apollo 8, over.

CAPCOM Apollo 8, Houston. Apollo 8, this is Houston, over.

SC Good morning, Mike. We had a little change of the guard here.

CAPCOM You sound real bright eyed and bushy tailed. How's it going up there?

SC Real great.

CAPCOM Apollo 8, Houston, how about giving us a countdown to PRD reading, over?

SC Fine.

CAPCOM Just on you, Bill. We got the other two while you were sacked out.

SC The one that I have now and the one that Jim took off with is obviously broken, it's still at .64.

CAPCOM Okay, thank you. Apollo 8, Houston, over. Roger, Bill on your PTC attitude, we're requesting a pitch angle 0, and we're showing you about 27 degrees pitch and increasing, over.

SC Roger, I've been trying to work it down though.

CAPCOM Now run your drive, that's all.

SC I have to every now and then just to square this thing away. Mike, I'll just give you my status here before the rest of them go to alseep. Had about 3 hours sleep, another meal, and everybody's doing fine.

CAPCOM Roger, Bill, thank you.

END OF TAPE

APOLLO 8 MISSION COMMENTARY, 12/26/68, GET 1341100, CST 9:02, 395/1

PAO This is Apollo Control, Houston, at 134 hours, 11 minutes and at the present time our spacecraft velocity is 7123 feet per second. Our current altitude reading is 73 952 nautical miles. Since our last report we've had virtually no conversations with the spacecraft with the exception of a short communications check put in by Mike Collins a few minutes ago and a terse "Roger" back from Bill Anders. There is nothing showing on the flight plan at this time. No scheduled activities. And both, Frank Borman and Jim Lovell are scheduled to be getting some rest at this time. We'd like to at this point, repeat some of the figures that were passed out earlier today at our change of shift briefing on the sequence of events at re-entry. We at the present time show 12 hours 33 minutes 55 seconds until entry interface. That event will occur at a ground elapse time of 146 hours 46 minutes 13 seconds approximately, and we anticipate there could be some change in that number following our final midcourse correction which is to come about 2 hours prior to entry interface. Blackout would nominally begin with the current trajectory at 146 hours 46 minutes 38 seconds, and it would last about 3 minutes. They would come out of blackout at 146 hours 49 minutes 41 seconds. Our drogue chutes, the 2 16-1/2 foot diameter conical ribbon chutes, that give the spacecraft its initial stabilization and slow it down prior to main chute deploy. And that event would come at 146 hours 54 minutes 27 seconds. We would be on the drogue chutes for about 47 seconds and then the main chutes would deploy at 146 hours 55 minutes 14 seconds. Our nominal splash time would be 147 hours 0 minutes and 11 seconds. At 134 hours 14 minutes into the flight of Apollo 8, this is Mission Control, Houston.

END OF TAPE

PAO This is Apollo Control, 134 hours 54 minutes into the mission. At the present time we are some 11 hours 52 minutes from the time of reentry. Apollo 8 is traveling at a speed of 7289 feet per second and the current altitude of the spacecraft is 70 989 nautical miles. Since our last report, we've had very little communication with the spacecraft. We'll play back for you what communication we have had and then stand by for any calls to the spacecraft or any calls down from the spacecraft.

CAPCOM Apollo 8, Houston. Apollo 8, Houston, over. Apollo 8, this is Houston, over. Apollo 8, this is Houston, over.

SC Roger, Mike, how do you read?

CAPCOM I read you loud and clear now, Bill. I wasn't hearing here for a couple of calls. How do you read me?

SC I had my hands full; I was putting something down. I read you fine.

CAPCOM Okay, understand. If it'll be any help to you in your PTC driving we've computed that as you look out plus X in the COAS or just out the window, you should be pointed right at Acrux when you're in a perfect PTC attitude. We don't know if that's a help to you or not, but we thought you might enjoy trying an alternate mode of keeping the attitude under control.

SC Okay, from my present position we're going to have to move Acrux a little bit.

CAPCOM Well, what ever you think. We just thought you might appreciate knowing.

SC I'll give it a try, Mike.

CAPCOM Can you see it all right?

SC Yeah, I think so. There's a star out there anyway. Houston, Apollo 8, do you read?

CAPCOM Go ahead, Bill.

SC Actually Mike, it's so easy to do it with the 8-Ball with a reasonable sloppy limit that it's hardly worth the trouble to scoot way up in the seat to look out the COAS and it's enough light in the cockpit where the star really isn't too easy to see. So I'm kind of inclined to use the IFR technique here where you can see the rest of the instrument panel.

CAPCOM Okay.

SC I thought you were an all weather pilot.

CAPCOM Well now, you just caused "flight" down here to ge a "Gotsya" on Cap Com and FAO.

SC Give you a little warning next time.

PAO This is Apollo Control. It appears that we will have no further conversations at this point. Now we'll take the circuit down at 134 hours 58 minutes.

END OF TAPE

PAO This is Apollo Control at 135 hours 39 minutes and it continues to be very quiet here in Mission Control and aboard the spacecraft. There are no scheduled flight plan activities at this time. Two of our Three crew men are continuing in a sleepful rest period. Bill Anders is awake and minding the duties aboard the spacecraft while Frank Borman and Jim Lovell catch up on their sleep. At the present time Apollo 8 is traveling at a speed of 7,480 feet per second and current altitude is 67,744 nautical miles. The clock here in Mission Control has been counting toward reentry now shows 11 hours 6 minutes prior to that event. This is the communications we have had with Anders in the past 45 minutes or so then we will stand by for any live conversation.

CAPCOM Apollo 8, Houston. We will be changing the antennas in 3 minutes. You can expect a COMM ...

SC Okay, Mike.

CAPCOM Apollo 8, Houston. Can you switch us to OMNI ... please. Thank you sir.

PAO That brings us up to date with the conversations with Anders over the last 45 minutes or so since our previous announcement. At the present time here in the Mission Control Center the large center display map of the world with the spacecraft ground track on it we're beginning to see a gradual effect of the increase in earth's gravitation influence on the spacecraft. That ground track now beginning to swing slowly northward and we'll see it between now and reentry swing even more northward and it will actually reverse its direction as the spacecraft plunges back toward Earth. It doesn't appear that we are going to have any further conversation with the spacecraft at this point. We'll continue to monitor and come back up periodically with status reports and in the event that we have any significant communications from the crew. This is Apollo Control at 135 hours 43 minutes

END OF TAPE

PAO This is Apollo Control 136 hours 04 minutes into the flight of Apollo 8. At the present time, we're in conversation with the crew. Frank Borman just came on the line and indicated that he had gotten some sleep and was now joining Anders. Apparently Jim Lovell is still sleeping at this time. We'll pick up that conversation and stand by to follow it.

SC Houston, Apollo 8. Are you still there?

CAPCOM Apollo 8, this is Houston. Go ahead. Over.

SC I was just seeing if you were still there, Mike. The Old Grey Eagle is taking over show here.

CAPCOM Which one of them?

SC We'll settle for chief.

CAPCOM Apollo 8, Houston. Over.

SC Go ahead, Houston.

CAPCOM Roger, Bill. We had an eraseable memory dump a few hours back. I think it was while you were asleep, but anyway we've checked the computers and eraseable memory bit by bit and everything agrees 100 percent. Over.

SC Mighty fine. Glad to hear it Mike. Thank you.

CAPCOM Rog. Are you going to brief Frank on your tape recorder before you go to sleep?

SC He can't handle it. It's too complicated.

CAPCOM Roger.

PAO This is Mission Control. At the present time, our spacecraft velocity is 7598 feet per second, and we're traveling now at an altitude of 65 851 nautical miles. Noting that the velocity is beginning to increase more rapidly now and our altitude decrease. At the present time we show 10 hours 39 minutes 25 seconds until entry interface. We'll continue to stand by briefly for any more conversation from the crew.

END OF TAPE.

PAO This is Apollo Control at 136 hours 52 minutes. Since our past report activity here in Mission Control and on the spacecraft has been minimal. We have had a few communications checks with the spacecraft and some routine housekeeping chores being done by the crew. Very little flight plan activity scheduled at this time. At the present time, Apollo 8 is at an altitude of 62 413 nautical miles and our velocity reads 7825 feet per second. We have one bit of interesting information from our flight dynamics officer, which illustrates the rapid velocity increase we will see as the spacecraft nears earth in its final hour of flight. Beginning at 145 hours 41 minutes, or about 1 hours prior to entry interface, we will have a velocity of 18 013 feet per second. During the next hour as the spacecraft closes on earth from an altitude of some 10 445 nautical miles, our velocity will just about double reaching 36220 feet per second. We saw much the same sort of thing happen as our spacecraft neared the moon. Where in the final hour or so of flight, we saw the dramatic increase in velocity and now returning to earth, we are seeing the same sort of thing. A gradual buildup until just about the last hour of flight and then that dramatic increase in velocity from 18 013 feet per second to 36 220. We have a brief bit of conversation on tape from the past 45 minutes or so. We will play that back for you now and will stand by briefly for any live conversation.

CAPCOM Apollo 8, Houston. Give us a different omni, please.

CAPCOM Thank you sir.

CAPCOM Apollo 8, Houston. Over. Apollo 8, this is Houston. Over.

SC Go ahead, Michael.

CAPCOM Roger we are going to switch to ground antennas in about a minute and a half. You can expect a comm break then.

SC Thank you.

CAPCOM Apollo 8, this is Houston through Carnarvon. Were you calling a minute ago, Frank.

CAPCOM Yes, we are reading you loud and clear now.

SC Carnarvon, how do you read Apollo 8?

CAPCOM Apollo 8, this is Houston. Reading you loud and clear through Carnarvon.

SC Hello Houston.

CAPCOM Go ahead, Frank.

SC We are just listening to all the guys around the Net.

CAPCOM Can you hear them?

SC I could that time, all the way from Carnarvon to Texas. How did they ever get an old maintenance officer on the midnight shift?

CAPCOM Frank, you are on GOSS conference, if you would like to be brave about it.

SC Okay.

CAPCOM Apollo 8, Houston. Omni Bravo, please.

CAPCOM Thank you sir.

END OF TAPE

PAO This is Apollo Control Houston at 137 hours, 32 minutes. We continue to have a minimum of conversation with the crew of Apollo 8. At this time the spacecraft is traveling at a speed of 8029 feet per second and our altitude reading has just now dropped below 60 000 nautical miles, now reading 59 517 nautical miles. We do have a small amount of conversation which we will play back for you now and stand by to pick up live anything that follows.

SC Houston, Apollo 8

CAPCOM Apollo 8, this is Houston, over. Apollo 8, this is Houston, over.

SC Have you noticed how long I've stayed locked in this PTC mode?

CAPCOM Just about an hour and a quarter looks like, Frank.

SC I haven't even touched the hand control here for about 20 minutes, the test just moved outside that zero, I've never seen it like this before. Be sure and have your troop give me a call if it gets close to gimbal like Williams, I'm snoozing a little bit now and then up here.

CAPCOM Yes, we sure will, Frank.

SC Thank you. And if you'd switch the antennas you'd really be good guys.

END OF TAPE

APOLLO 8 MISSION COMMENTARY GET 138:17:00 CST 1:08 pm 401/1

CAP COM This is Apollo Control, Houston, at 138 hours, 18 minutes. Since our last report some 40 minutes ago, we've had no conversations with the spacecraft. Our flight plan shows no activities at this time. We expect that both Jim Lovell and Bill Anders are getting some sleep. Frank Borman is on the watch at the present. And our spacecraft vital statistics, here comes the velocity and altitude are now 8,309 feet per second for velocity and 55,817 nautical miles is our current altitude. At 138 hours, 19 minutes, this is Apollo Control.

END OF TAPE

CAP COM This is Apollo Control, Houston, at 138 hours 57 minutes, and at the present time our spacecraft is at an altitude of 52,745 nautical miles, traveling at a speed of 8,563 feet per second. We heard from Bill Anders aboard the spacecraft a short while ago, and Bill informed us that there had been a change of watch, that he had relieved Frank Borman. We will play that conversation back for you, and then stand by for any further communications from the spacecraft.

CAP COM Apollo 8, Houston. Over.

SC Houston, Apollo 8.

CAP COM Roger. Just a check on the radio and if its practical, biomed switch left, please.

SC Okay, Mike. We had a crew change in the watch again.

CAP COM Well, that was quick. Did you decide you didn't want to sleep after all?

SC Well, it was my decision.

CAP COM Yeah, that's what I figured.

CAP COM Apollo 8, Houston, we will be changing manned antennas in about two and a half minutes, do you expect a com glich?

SC Roger. We are goiug to change it too.

CAP COM We're switching from Carnarvon to Honeysuckle, Bill.

SC Roger.

CAP COM Here in Mission Control Center at the present time, we are involved in a change of shift. Our flight director Milton Windler and his team of flight controllers are coming on, getting updated on the status of the spacecraft, crew, and preparations for the re-entry. This is the team coming on that will be handling the re-entry, and that event now scheduled to occur some seven hours and 47 minutes from now. Simultaneously with the change of shift down here in the Control Center, we also began to pick up activity in the flight plan related to the final midcourse correction and re-entry. Now we are scheduled to have a platform alignment in about 15 minutes aboard the spacecraft, and that will be followed by an eat period for the commander. The flight plan shows the command module pilot to continue sleeping until about 141 hours and at the present time, it appears that Frank Borman and Jim Lovell are resting or sleeping. We will continue to stand by for a short while for any further communications from Bill Anders, and then we'll take the circuit down if we don't hear any.

CAP COM This is Mission Control, Houston. It appears that things are going to continue along quietly, at least for the moment. We would like to advise that we will have a change of shift briefing scheduled following this shift, and we anticipate this will occur between 2:15 and 2:30. This is Apollo Control at 139 hours 2 minutes.

END OF TAPE

PAO This is Apollo Control at 139 hours 15 minutes. At the present time, Apollo 8 is at an altitude of 51 198 nautical miles and our velocity is 8 698 feet per second. A short while ago we had this conversation with Bill Anders.

CAPCOM Apollo 8, Houston. Over.

SC Go ahead, Houston.

CAPCOM Roger. Apollo 8. Your Green Team will be signing off in a few minutes and before we do, Charlesworth and the rest of us would like to say we have enjoyed it, and look forward to seeing you back in Houston. Over.

SC We have sure enjoyed it too, Houston. You guys are really doing a good job. We appreciate it.

CAPCOM (garbled) We will be seeing you Bill.

SC Okay, Mike. We will see you Buddy. Tell old Cliff adios for me.

CAPCOM Sure will.

END OF TAPE

CAP COM Apollo Control here at 139 hours 52 minutes, and a good, good morning from the maroon team. We're 48,000 miles from home, moving at nearly 9,000 feet per second. And in the last half hour we have had these bits and pieces of conversation with the crew. Among other items of interest, Jim Lovell awakened, which you may already know. He awakened a little bit earlier than his planned seven hour sleep period, he was awake at least a half an hour ago. Here's our recorded conversation.

CAP COM Apollo 8, Houston.

SC Go ahead, Houston.

CAP COM Apollo 8, we'd like to have you, before you get a P52 going here, we'd like to have you review all the optics and read us the mechanical CTU, we're trying to collect a little data for troubleshooting.

SC Roger. Stand by.

CAP COM I got you.

SC What questions are you trying to trouble-shoot?

CAP COM This goes back to some of the problems we had prior to LOI. Might see if the softwear readouts we're getting down here compare with the mechanical readouts. Not a current problem as far as we know.

SC Okay.

CAP COM Apollo 8, Houston.

SC Go ahead, Houston.

CAP COM Okay. Why don't you just read me the mechanical CTU's there now, and then it looks from the ground like you're ready to go ahead with the P52.

SC Okay, we'll get squared away here in just a minute.

SC Good morning, captain.

CAP COM Good morning, sir.

SC This will be a piece of stew out of a deep sleep. Stand by one. Trunion mechanical CQ looks about like 1 100.

CAP COM Roger.

SC And the shaft mechanical OCU looks like it is reading about 400 below zero, which is about 364.

CAP COM Understand, Jim. That is 400 below zero on that shaft, is that affirm?

SC Yes. Stand by one. About 35996 on the shaft.

CAP COM Okay. You can go ahead with P52 now.

SC Okay.

SC I always said you did better in your sleep.

CAP COM Apollo 8, Houston.

SC Go ahead, Houston.
CAP COM Okay. It looks like we're getting down on the service module RCS to the place where we ought to go ahead and activate the secondary service module RCS propellant.
SC Okay. Stand by.
CAP COM Apollo 8, Houston.
SC Go ahead.
CAP COM Okay. We've got a new PPC attitude. For the pitch, 180, for the yaw, 315.
SC Roger. Yaw, 315.
CAP COM Roger. And pitch 180.
SC Okay. Can't you pick one a little further away?
CAP COM Not in our normal sphere.
SC Ken, this is Jim.
CAP COM Go ahead.
SC Aren't we still a little high on the cloudy side to activate the secondary?
CAP COM Negative. We have quad Bravo and quad Delta which are getting right down, according to the calculatrf numbers, next to where we will be activating them. The numbers you are reading are going to be a little bit high, but the computer data on the ground shows that you have about 134 pounds in Bravo and Delta, and about 130 pounds is where you ought to be on the secondary.
SC Okay, Roger. We will activate the secondary and turn off the primary.
CAP COM Okay. It's just to keep you from running one of them hot.
SC Roger. Secondary activation.
CAP COM Roger.

END OF TAPE

APOLLO 8 MISSION COMMENTARY,12/27/68,GET1404000,CST 3:31A,405/1

PAO This is Apollo Control Houston, 140 hours 40 minutes into the flight and we just had a chat with the crew which was significant in two respects. They were advised that we would not have another midcourse. None was necessary. And we heard from Frank Borman that the crew was up now, alert and awake, and Frank said they had a real good night's rest. And they are all set for the reentry. Here's the conversation.

SC Houston, Apollo 8.

CAPCOM Go ahead.

SC Ken, on this maneuver, MCC-7, are you going to - are we going to burn the PAD data that we got some time ago or is there a new maneuver coming up or what's going on in that regard?

CAPCOM Okay, Apollo 8. If required, we'll give you a new one. Right now we are looking at not making a maneuver burn at all.

SC You say we may not even have another one now?

CAPCOM That's right.

SC Okay, you're the boss.

CAPCOM Apollo 8, Houston. Apollo 8, Houston. Apollo 8, Houston. Could you try another omni? Apollo 8, Houston. Try another OMNI please. Apollo 8, Houston. Apollo 8, Houston.

SC Go ahead, Houston. Apollo 8.

CAPCOM Okay. Read you loud and clear now. Just wanted to remind you that in the event of a loss of COMM, we don't want you to burn MCC-7. Your present entry PAD is good. We'll be updating your landing points at the same time that you would have gotten MCC-7 and I'd like to have a crew status report from you when it's convenient.

SC If we do lose COMM, you do not want us to burn MCC-7, just go ahead and use the entry PAD you've given us?

CAPCOM That's affirmative. You'll be within .06 degrees of your entry angle target line.

SC All right. The crew status is: everybody has gotten real good rest last night and everybody is in good shape. Jim is just waking up and Bill is starting the initial stowage and we all feel very well.

CAPCOM Okay. Okay and we'd like to - guess we need a PRD reading from you. And we'll be needing one in the neighborhood of 145-hour period, somewhere when it's convenient in there again.

PAO And that wraps up the position of the crew at 140 hours 44 minutes into the flight. This is Apollo Control Houston.

END OF TAPE

PAO Apollo Control, Houston at 140 hours, 55 minutes into the flight. And before we get all wrapped up in the entry process, why don't we take a final look at our onboard system quantity readings? Our cabin pressure remains, as it has now for some days, at 4.9 pounds per square inch; cabin temperature, 78 degrees. The amount of waste water on board right now is 69.5 percent of the tank capacity or 38.9 pounds. The potable drinking water quantity remains as it has throughout most of the mission at slightly over 100 percent, it is constantly being refilled from the fuel cell production. The potable quantity in pounds is 37.3 pounds. And the temperature of the water dump nozzle is 65 degrees Fahrenheit. Now in the oxygen area, tank 1 has 59 percent of its oxygen supply remaining, and tank 2 has 59.5 percent, and the hydrogen area, the number on tank 1 is 40.4 percent, tank 2, 42.5 percent. As we dial up further displays, we will give you that information. And pilot biomed harnesses, we are not taking information right now apparently, have turned that system down for the duration of the mission. And we are still searching here, stand by one. For your information, we are 42,293 miles away from earth now, and velocity has built up to 9600 feet per second. To convert that to statute miles per hour, you multiply by .68. The oxygen flow is running at .3 pounds per hour. Point 3 pounds per hour. The fuel cell status still load sharing very nicely. Fuel cell 1 carrying 33.1 percent, fuel cell 2, 32.2, fuel cell 3, about 34 percent, all very steady values, no problems at all on our fuel cells during the flight. And we have some conversation recorded from the crew, why don't we play that now?

SC Houston, Apollo 8.

CAP COM Go ahead, 8. Apollo 8, Apollo 8, Houston, go ahead.

SC Roger! Could you give us our range and our correction in our velocity and range from the earth now?

CAP COM Stand by. Apollo 8, Apollo 8, Houston. At time prime one, your velocity will be 9526, altitude 42946. Over.

SC Thank you.

END OF TAPE

APOLLO 8 MISSION COMMENTARY,12/27/68,GET 1412900,CST 4:20A,407/1

PAO This is Apollo Control Houston here at 141 hours 29 minutes. It's been at least a half an hour since we've heard from the crew but no concern here. Things are very quiet obviously in the spacecraft. They're very quiet here in the Control Center. I suppose the two most active areas are the recovery forces. They're working very hard to make sure the adequacy of their communications circuits. They're running almost constant checks. And the retro people, who work very hard over this final entry into atmosphere maneuver. And all the members associated with it - they're working and comparing and talking to each other at a brisk pace. Other than that, it is all quiet at 141 hours and 30 minutes.

END OF TAPE